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ABSTRACT

This brochure, one in a series of four, is designed to assist parents encourage their daughters efforts related to mathematics and science. Addressing the parents in a personal manner, six sections give parents suggestions on how this can be accomplished. The first section emphasizes to parents the importance of mathematics and science in possible career choices. The second section addresses the importance that parent encouragement has on their daughter's attitudes toward mathematics, science, and related careers. The third section recommends activities that parents can do at home to foster a more positive view of mathematics and science. The fourth section discusses ways that parents can help reduce stereotypes related to women's roles in science and mathematics. The fifth section recommends that parents be more critical of information that stereotypes women's abilities in science and mathematics. The final section recommends actions that parents can take when they think that their daughters are treated with bias toward their abilities in science and mathematics. A list of eight resources is provided. (MDH)

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Encouraging Girls in Math and Science

Math, Science, and Your Daughter

What Can Parents Do?

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U.S. DEPARTMENT OF EDUCATION
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Know Math and Science Are Important

The amount of math your daughter takes acts as a "critical filter" limiting

- the jobs she can get
- the colleges she can go to
- the college majors she can choose

Without at least three years of high school math, your daughter will be excluded from a wide variety of jobs including

Programmer	Accountant
Biologist	Medical Technician
Architect	Doctor

In most schools, the key "math decision-making times" are

8th grade, when most students decide if they will take algebra in 9th grade, an important first step to continued math involvement (although more advanced students may take algebra in 8th grade) and

11th grade, when math requirements for college admission are fulfilled and girls are more likely than boys to stop taking math (this happens in 10th grade for girls who took algebra in 8th grade).

Out-of-date ideas and discrimination help convince many talented girls that math and science aren't for them.

It doesn't have to be that way. As parents, there are many things you can do to help your daughter give math and science a second chance.

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Use Parent Power to Encourage Your Daughter

Parent encouragement works.

"My mother and father encouraged me to enter whatever field I desired."

"My parents and teachers encouraged me by giving me confidence that I could achieve what I wanted."

In studies of women engineering, math, and science students, parents were most frequently mentioned as the most important influence in young women's decisions to go into science or engineering.

Encouragement doesn't have to be financial or informational (although these don't hurt). You don't have to be a scientist or an engineer to give your daughter confidence.

Today, most girls know *women* can be scientists and engineers, but many have been told that *they* wouldn't be able to do it and not to try.

Whether it's staying in science, working with computers, or doing a science fair project, having you, their parent, say "try it, you may like it" can make a difference.

Lack of encouragement can hurt.

"I could never do math."

"I always hated math when I was a child."

Making comments like these tells your daughter it's OK not to do well in math or not to do math at all. Your negative as well as positive comments influence your daughters (and your sons).

Watch what you say. Almost 20 percent of college and high school women questioned said parental discouragement was a barrier to their going into engineering. To encourage your daughter in math and science, "accentuate the positive; eliminate the negative."

Make Math and Science Fun

"In fourth grade, my daughter came home and said she hated math, that it was boring. I told her that maybe what she was learning in school was boring, but math was fun and exciting. So we started to do 'fun' math together."

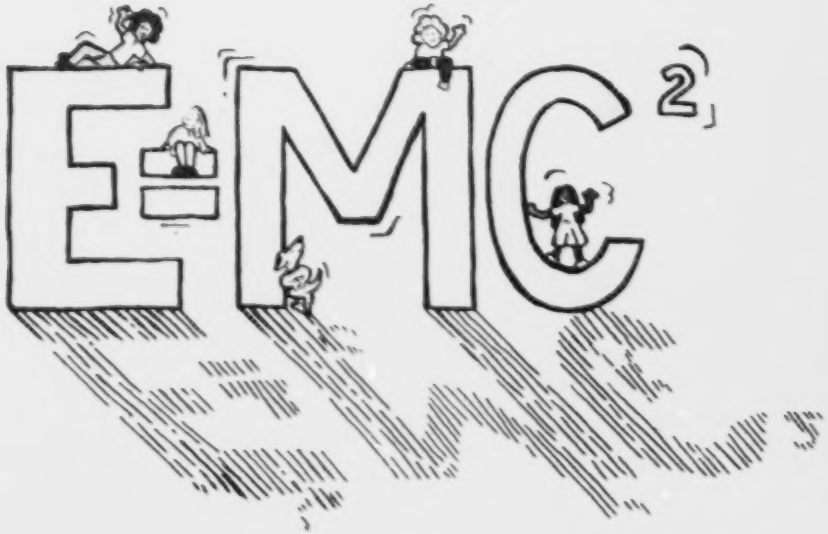
Fun math and science can start early with families

- doing puzzles together
- watching "Square One" on TV
- going to science museums
- taking things apart
- even making up word problems with silly characters and situations such as a 42-year-old goldfish named Clyde who has a sister Gertrude who is twice as old as he. How old is Gertrude?

Many schools and community organizations are conducting "Family Math" programs where elementary school children and parents do fun, hands-on math together. They do activities such as "Perfect People" where families measure each other to see if they are "tall rectangles," "short rectangles," or "perfect squares."

If your school has a "Family Math" program, go. If it doesn't, suggest one be started and then go.

Just talking helps. Discuss science in the news with your child. Praise scientists (who deserve it). Ask your daughter what she is doing in science class. Have her help in family activities that use math and science, such as measuring for a new rug.



Making math and science part of your family's everyday life makes a big difference.

Help Reduce Stereotypes

Girls still see barriers to careers in science and engineering.

Surveys of high school and college students have found the major barriers girls see to entering science and engineering are sex discrimination and the perception of engineering as a "male profession." Helping your daughter learn about the roles women play in science can change these perceptions.

Girls, particularly girls who are good in math and science, worry about the "nerd" factor—that men and especially women who are good in math and science are "strange" and antisocial misfits. Exposing your daughter to both women and men scientists can replace the negative stereotypes with positive perceptions of real people.

Somewhat surprisingly, concerns about combining careers and families are not seen as serious barriers by most girls.

Things are getting better.

While sex discrimination is still an issue, young women in science and engineering say that it's not as tough out there for young women. They say

"Guys seem a lot more considerate and more willing to accept women as their equals."

"Most of the guys here have figured out that women make great friends. We're not just prospective dates."

"Professors pay attention to . . . students but especially to girls."

Make sure your daughter knows this.

Be Critical of the World Around You

Beware of what we see on TV and read in the papers. "News" can influence how we view our daughters and their future, particularly in math and science.

Research that supports math and science stereotypes gets much more attention in the media than does work that challenges them. For example:

When one researcher says boys' higher SAT scores mean that boys are biologically superior to girls in math, she gets invited to the "Today Show" and is written up in the *New York Times*.

But when another researcher says that society and test bias cause boys' higher SAT scores, she gets to go home and make dinner. Her results aren't considered news.

Be aware that there is a lot of incomplete, inaccurate, and just plain wrong information around about girls and math and science.

No matter what you have heard, there is *no such thing* as a math gene that causes boys to be better in math. The British Royal Society has concluded that "there is no convincing evidence of innate gender differences in mathematical ability."

The National Research Council of the United States found "almost no differences in performance among male and female students who have taken equal advantage of similar opportunities to study mathematics."

Many girls are very skilled in math and science, more skilled than most boys. Your daughter may be one of them.

Take Action When Necessary

"In sixth grade, my daughter's teacher recommended her for 'average' math. Knowing that she liked math and was good at it, I said no, she should go into advanced math. Three years later, she is getting As in honors-level geometry."

Because of sex bias, some teachers and guidance counselors are not supportive of girls' interest in math, nor do they see a great need for girls to take upper-level math courses.

If you think your daughter is good in math *and* she thinks she might like to take more of it, you can *insist* that she be placed in a more advanced math class or that she not drop math.

In many states, parents have a right to override teacher and school decisions about their children. Your state representative's office or a lawyer can tell you if this is the case in your state. Together, you and your daughter can do it!

But we need to remember that teachers are people too. As parents, many of us feel intimidated by teachers and the authority they represent. This feeling can stop some parents from becoming involved and cause others to come on too strong.

Teachers, like the rest of us, respond better to parents who

- listen
- give praise, when it is deserved
- know what they want
- don't give up

Remember

Biology is not destiny.

Math and science can be fun.

You can make a difference for your daughter.

Resources

Family Math. Project EQUALS, Lawrence Hall of Science, University of California, Berkeley, CA 94705 (415)642-1823. Provides opportunities for parents and children to do hands-on math under the direction of teachers or community leaders. Publications include *Family Math*, a book of hands-on math activities for parents and children.

Math/Science Network, 678 13th St., Suite 100, Oakland, CA 94612 (510)893-MATH. Supports a series of one-day hands-on sessions for girls on women in science.

NACME (National Action Council for Minorities in Engineering), 3 West 35th St., New York, NY 10001 (212)279-2626. Provides a variety of tutoring and career exploration projects for minority students interested in science and engineering.

Operation SMART™. Girls Incorporated, 30 East 33rd St., New York, NY 10016 (212)689-3700. Provides curriculum and training models in math, science, and technology for working with girls in out-of-school settings. Publications include *The Power Project*, a book of hands-on science activities for girls.

Society of Women Engineers, 345 East 47th St., New York, NY 10017 (212)705-7855. Provides a variety of mentoring and career exploration projects for girls interested in science and engineering.

U.S. Department of Education, Washington, DC 20208 (800)424-1616. Provides a variety of publications including *Helping Your Child Learn Science*.

Women's Action Alliance, 370 Lexington Ave., Suite 603, New York, NY 10017 (212)532-8330. Provides resources and training in computer equity for girls, including the brochure "Does your daughter say 'No, thanks' to the computer?"

The research and evaluation results on which this brochure is based are available from Campbell-Kibler Associates, Groton Ridge Heights, Groton, MA 01450.

Other brochures in this series include

"Nothing Can Stop Us Now: Designing Effective Programs for Girls in Math, Science, and Engineering"
"What Works and What Doesn't? Ways to Evaluate Programs for Girls in Math, Science, and Engineering"
"Working Together, Making Changes: Working in and out of School to Encourage Girls in Math and Science"

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